WISIONS of sustainability

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PREP

Promotion of Resource Efficiency Projects

# Water for energy and energy for water

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# WISIONS

## Sustainable development is possible

WISIONS is an initiative of the Wuppertal Institute for Climate, Environment and Energy, carried out with the support of the Swiss-based foundation Pro-Evolution, to foster practical and sustainable energy projects.

Sustainable development is possible. Numerous innovative and valuable contributions from different countries, fields and institutions have shown that an appropriate reconciliation of economic, ecological and social factors is not unrealistic utopia. We have made a promising start, but the greatest challenge still facing us in the 21st century is to learn how to use the world's resources more efficiently and in an ecologically sound and socially balanced way.

Progress is being made; however, sixteen years after the UN Conference on Environment and Development in Rio de Janeiro, many people, especially in developing countries, still lack access to resources, clean technologies, and education. At the same time, people's level of resource consumption and means of production remains unsustainable.

To meet global challenges like climate change, water scarcity and poverty, it is necessary to foster projects of potential strategic global importance by supporting them so that they can be implemented locally. Examples of good practice need to be actively promoted to a wider audience.

WISIONS promotes good practice in resource efficiency through its publication of relevant successful projects in its Promotion of Resource Efficiency Projects: PREP

WISIONS also provides consulting and support to ensure the potential seen in visions of renewable energy and energy efficiency can become mature projects through its Sustainable Energy Project Support: SEPS

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# WATER FOR ENERGY AND ENERGY FOR WATER

In 2004, WISIONS presented good practice examples on water and energy in its second brochure "Water and Energy – Precious Resources". Four years on, the topic is as important as it was then.

The urgency becomes clear when bearing in mind that, at present, 1.1 billion people in developing countries have no access to safe drinking water. Furthermore, 2.6 billion people lack access to basic sanitation. Around 70% of consumed surface or ground water is used for agricultural purposes. Moreover, withdrawals for land irrigation are estimated to grow by 14% between 2000 and 2030. Additionally, the agricultural sector is facing competition from other sectors that are also increasing their demand for water, forcing agriculture to improve irrigation efficiency, to decrease pollution and to use recycled water.

Above all, there is the connection between water and energy. Water, on the one hand, is a driving agent for renewable energy with great potential to improve the energy supply for people who lack reliable access to electricity or use inefficient energy sources. On the other hand, renewable energy can be a promising solution for the provision of drinking and/or usable water.

## WATER FOR ENERGY

Small hydropower plants are a reliable supplier of electricity generation, especially for rural populations without access to grid electricity. Furthermore, in comparison to their larger counterparts, these plants are both environmentally and socially sound and can lead to independence from other energy providers. More recent attempts to use water for energy generation are evident in the establishment of wave and tidal power plants. The kinetic and potential energy of the waves, derived from their orbital movements and head difference between crest and trough, are converted into electrical energy.

## ENERGY FOR WATER

Providing water of an optimal quality usually requires energy, for example groundwater pumping, desalination or irrigation. These activities are especially challenging in remote regions lacking access to conventional energy systems. In such circumstances, renewable energy, especially solar energy, can be a good alternative as it is a decentralised source of energy. However, regions with grid access can also take advantage of the use of renewable energy for the different kinds of water provision. For example, desalination of water is often needed in areas with high solar radiation and using the sun as a source for energy is a reliable solution that benefits the environment as well as the economic situation.

In this brochure, WISIONS focuses on the interdependent connection between water and energy. WISIONS presents good practice projects dealing with water and energy in Guatemala, Peru, Tunisia, the Philippines and Tanzania that have been successfully implemented, with the intention of further promoting the particular approaches used by these projects. Using a key number of internationally accepted criteria, the main consideration for the selection of the projects was energy and resource efficiency. The assessment of the projects also included the consideration of regional factors acknowledging different needs and potentials.

All projects that fulfilled WISIONS application criteria were independently reviewed, and 5 of them, with the potential to make a significant impact on global energy and resource efficiency, are published in the following pages. WISIONS is pleased to present good practice examples from ambitious projects that have been successfully implemented on different continents. All of these projects are appropriate within their local context and have been developed to a level that meets WISIONS selection criteria. Although uniquely designed for a particular setting and problem, the projects presented can be adapted to different situations or can provide valuable information from their implementation phase. Links to the illustrated good practice examples shown in the brochure, as well as a couple of other issue-related good practice projects, are available on www.wisions.net.

Photo: photocase.de@momosu

The selected projects are not intended to represent the only possible courses of action to take in the area of water and energy, but they do demonstrate promising approaches.

This issue is the 12th and final PREP brochure. All existing PREP brochures will remain available online at www.wisions.net/pages/Downloads. For more information about the future direction of WISIONS please go to page 14.

# Rehabilitation of the micro-central hydroelectric installation in the community of Nueva Alianza

**Location:**
Guatemala

**Project's Aim:**
Substitute fossil fuels in energy production

**Technical Answer:**
Rehabilitation of old micro hydropower structures

**Project's Duration:**
June 2005 – October 2006

Photo: Andrea Aragón, SGP Guatemala

Photo: Andrea Aragón, SGP Guatemala

For five generations the families of the community of Nueva Alianza lived and worked on an estate owned by a landlord, who managed and remunerated their work in his coffee and macadamia plantations. When the landlord abandoned the estate due to debt in 2001, the families of Nueva Alianza acquired the legal status to manage the land without, however, owning it.

Tired of their previous exploitation and of the current situation, the families of Nueva Alianza formed the Sindicato de Trabajadores Independientes (STIAP, syndicate of independent workers) and peacefully occupied the community's land in 2002. The Fondo de Tierra (Land Trust) bought the estate for Nueva Alianza in November 2004.

STIAP decided to initiate a project that included the rehabilitation of some idle structures that had been abandoned during the landlord's days. This incorporated the rehabilitation of the old micro hydropower structures, a coffee plant with operative machines, empty houses, electrical generators and a diesel engine. The project also comprised the construction of new civil works, the installation of transmission and distribution lines, the building of 40 domestic electrical and water connections and an additional one for industrial use.

## Benefits

The main benefit of the project was the generation of non-polluting, renewable and cheap energy by means of exploiting the potential energy of dammed water channelled through a turbine and a generator. The energy that is produced supplies agro-industrial activities for the production of macadamia nuts and is also used for household consumption. The families also produce purified water and sell the bottled water in surrounding towns.

In 2005, the community won the productivity award "a la Productivadad" from the government of Guatemala.

Another positive impact of the project was the establishment of community self-management. The project enabled the current "Comité de Mujeres" (Women's Committee) to establish another Committee

to liaise with the management of the energy service. During the project, the Committee organised 15 workshops covering topics such as the construction of hydraulic structures, how to repair the conduction canal, how to maintain the micro hydro plant, etc.

On a regional scale, the project led to an increase in public and political awareness about issues such as the environment and alternative ways of sustainable living.

## SUSTAINABILITY

The sustainability of the project is secured by the productive use of energy for producing macadamia nuts and coffee, by the selling of purified water and by the running of an eco-hotel.

Every male member of the community has a specific duty, such as reading the electricity meters, collecting a monthly fee from each beneficiary for the maintenance of electrical installations, or running the hydropower centre. Every male within the community has to fulfil this duty for one day every 20 days.

Photo: Andrea Aragón, SGP Guatemala

## TECHNOLOGY

The micro hydropower plant has an installed capacity of 10kW. It was designed to run two electrical generators, each with a capacity of 8kW, which increases the total power to 16kW. In the winter season, when heavy rain swells the river, both generators are used.

In the dryer summer season, Nueva Alianza produces biodiesel by recycling oils from kitchens, nearby restaurants and a leisure park. Instead of water, the biodiesel is then used to run the electrical generators.

## FINANCIAL ISSUES

The project was financed in equal shares from donations from the GEF Small Grants Programme and the community of Nueva Alianza. In total, the cost was in the region of US$47,000.

## OBSTACLES

One of the most significant obstacles was hurricane Stan at the end of 2005, which delayed the work by several weeks and also destroyed some houses and previous construction work.

The second major obstacle was the cost. Clearing the devastation caused by the hurricane, combined with sudden fluctuations in currency rates, led to some necessary adjustments in relation to sources of supply, redesign and project duration.

## REPLICABILITY

The possibility of replicating this project in other regions with similar needs and resources is good. The most important issue for this kind of project is the engagement of the local population. The availability of hydropower would facilitate the work and lessen the cost of a similar project.

Photo: Andrea Aragón, SGP Guatemala

## CONTACT

**STIAP Sindicato de Trabajadores**
Mr. Javier Jiménez
e-mail: amadorecinos@gmail.com
URL: www.comunidadnuevaalianza.org

**GEF Small Grants Programme Guatemala**
Mr. Alejandro Santos, Ms. Liseth Martínez
e-mail: alejandrosantez@gmail.com,
li.martinezf@gmail.com
URL: http://sgp.undp.org

The GEF Small Grants Programme

# Micro hydropower stations promotion fund

**Location:**
Peru

**Project's Aim:**
Improve the living conditions of isolated rural communities

**Technical Answer:**
Technology transfer of low cost and easy to operate micro hydropower stations

**Project's Duration:**
November 1992 – December 2005


Photo: Practical Action

In Peru, nearly 6.5 million people do not have access to electricity. Most of these people live in rural areas, where more than 67% of the population endures daily life without electricity, accentuating and perpetuating rural poverty. Due to the extensive and complicated geography of Peru, it is probable that the electricity grid will never reach the isolated, poor and uninhabited areas. Therefore, one promising alternative is to use renewable energy sources.

Between 1992 and 2005, Practical Action implemented the Micro Hydropower Stations Promotion Fund, supported by the Inter-American Development Bank (IADB). In the course of this project, Practical Action developed several technologies that are appropriate for the Peruvian mountain conditions, with a particular focus on low production costs.

Photo: Practical Action

## BENEFITS

One of the main environmental benefits is the reduction of indoor air pollution, as electric light has replaced candles, lighters, kerosene and associated matches. Additionally, greenhouse gas emissions have been reduced by an estimated 34,172 tonnes of $CO_2$. This calculation was based on the emissions that would have been produced if a diesel station had been installed instead of the micro hydropower stations.

In addition to the environmental benefits, the project has had several social benefits such as better communication through the widespread use of television and radios, lighting for studying at night, electricity for computers and audio-visual equipment in schools and more lectures thanks to teachers staying longer in the communities. Lighting in community centres and health centres has made it possible to provide a better service thanks to equipment such as stoves, iceboxes, humidifiers, freezers, sterilisers, electric boilers and radios. In addition, an inadvertent positive side effect is evident in improved communications within public sector government organisations.

Other important benefits are of an economic nature: on average, families made energy savings of 70%

(worth between €26 and €79 per family per year) by discontinuing the use of candles or kerosene, and batteries. Thanks to the productive use of energy, several new businesses such as restaurants, lodgings, mills etc. have been created, leading to increased sales and improvements in production.

## SUSTAINABILITY

This project transferred technologies that were already developed to small companies. This included the sharing of methodology and techniques that decrease machine costs. The project ensured that the applied technology was low cost and easy to operate and maintain. In order to carry out the management of the systems, people were trained within their own communities. If necessary, local operators know whom to approach for specialised technical assistance to carry out corrective maintenance works.

## TECHNOLOGY

In total, 47 micro hydropower stations and 50 photovoltaic systems have been installed, storing 1.57MW of power in 48 rural communities. Counting the system users as direct beneficiaries, 5,094 families (around 30,000 people) have benefited from the project.

## FINANCIAL ISSUES

The project was funded through a combined finance scheme. This included financial support from the Inter American Development Bank (IADB) of almost €580,000 and donations from NGOs or other agencies, together with local and regional government investment, of almost €1,920,000. End-users contributed around 20% of the total system cost by means of labour and credit (between €130 and €340 per family with repayment periods of between 3 and 6 years).

Regarding payment for the service provided, Practical Action successfully designed and tested a rate scheme based on consumption. In this scheme, rates per kWh decrease as energy consumption increases. This is different to the normal rates in urban areas, and it contributes to the promotion of productive uses of energy.

## OBSTACLES

The main barriers to the expansion of renewable energy as a viable option for rural areas are the shortage of appropriate available technology, the lack of appropriated financial mechanisms, limited local capacities and the lack of decentralised models for the basic services management.

In order to overcome these obstacles, appropriate low cost technologies for small scale hydro energy use, a combined finance scheme, a management model based on local capacities to ensure system sustainability, and a rate scheme promoting productive energy use were all successfully developed in the course of the project.

Photo: Practical Action


Photo: Practical Action

## REPLICABILITY

One advantage of the experience gained from this project is that the lessons learned can be applied individually or collectively. This is because its strategy has been designed to overcome specific barriers. It is possible to begin a programme of micro hydro energy in another country by replicating one, some, or all of the components of this experience.

From 2006, the project began a new phase under the name of Renewable Energy Promotion Fund (FOPER), striving to include other types of renewable energies and aiming to involve other countries, such as Bolivia, Ecuador and Colombia.

## CONTACT

**Practical Action, Latin American Regional Office**
Mr. Javier Coello
e-mail: jcoello@itdg.org.pe
URL: www.itdg.org.pe

PRACTICAL ACTION
Technology challenging poverty

# PV-RO DESALINATION STAND-ALONE SYSTEM IN THE VILLAGE OF KSAR GHILÈNE

**Location:**
Ksar Ghilène, Tunisia

**Project's Aim:**
Produce fresh water from the existing brackish water well with a renewable energy system

**Technical Answer:**
Installation of a solar photovoltaic reverse osmosis desalination plant

**Project's Duration:**
September 2004 – April 2007

Photo: Canary Islands Institute of Technology (ITC)

Over the past few decades, desalination has become one of the main supply sources of drinking water and it is still an important solution for some countries in the Mediterranean, Africa, Middle East, etc. Desalination plants demand energy to operate; therefore, renewable energies can play an important role as energy sources in order to provide and obtain water.

Within the framework of the Spanish-Tunisian Cooperation, a project to supply fresh water through an RO (Reverse Osmosis) desalination unit driven by stand-alone solar photovoltaic energy was implemented. Ksar Ghilène is an isolated village with 300 inhabitants, located in the Sahara Desert in the south of Tunisia. The nearest electrical grid is 150km away so houses are provided with electricity by solar home systems and the street lighting works with photovoltaic streetlamps.

Photo: Canary Islands Institute of Technology (ITC)

## BENEFITS

The most important environmental benefits include applying renewable energy for desalination and avoiding transporting water every week from 60 km away.

The project facilitates the economic development of Ksar Ghilène, since the constant source of in situ drinking water considerably improves living conditions. Availability of fresh water also improves opportunities for agricultural development, cattle farming and tourism.

The project has also improved social equality. Water is a natural, but limited, resource and is fundamental to life and health. The right to fresh water is indispensable in order to live with dignity and it is, also, a precondition for achieving other human rights.

## SUSTAINABILITY

In a year and half of operation the desalination plant has successfully produced more than 3 million litres of fresh water and has functioned for over 1,900 hours.

After the initial stage of system installation and commissioning, the second stage of the project

recently began, namely to guarantee an uninterrupted drinking water supply by means of proper management. Over a 12 month period (March 2008 to March 2009) the Canary Islands Institute of Technology (ITC) is offering the villagers technical assistance in the operation and maintenance of the installed equipment and is also running various sessions for additional training.

## TECHNOLOGY

Prior to this project, there was a hydraulic distribution network of water from a 30m$^3$ water tank to five sources distributed along the village. However, the drinking water well had dried up, so until the implementation of the project the drinking water supply came via tankers once a week from a well located 60km away.

Now fresh water is produced from the existing brackish water well located in the nearby oasis (2.1km away), by means of a 50m$^3$/day RO desalination unit. This unit operates in an autonomous system driven by a 10.5kWp photovoltaic solar generator with energy accumulation in batteries. The whole system is controlled automatically and 15 m$^3$/day of fresh water is produced and distributed in the village through the five public fountains.

## FINANCIAL ISSUES

The project depended on international cooperation for funding; it was financed by the Spanish International Cooperation Agency for Development (AECID) and the Canary Islands Government through the General Direction for Relationships with Africa (DGRA). The Tunisian partners are the National Agency for the Control of Energy Consumption (ANME) and the Regional Direction for Agricultural Development of Kèbili (CRDA). Canary Islands Institute of Technology (ITC) is responsible for project delivery.

The cost of the first project stage of system installation and commissioning was €264,000, of which more than €150,000 was allocated to investment in equipment and infrastructure. €36,200 of the total was used for personnel costs, €100,700 for investment in equipment and €50,000 for civil and hydraulic engineering installations. The remaining funds were used to cover ongoing and administrative expenses and services (e.g.transport).

## OBSTACLES

The main obstacles to the implementation of the project included:

- The harsh climatic conditions in Ksar Ghilène, which had to be taken into account when designing the installation.
- The lack of knowledge on the part of the local authorities in terms of how to progress such a project. This led to delays in terms of the initial planning.
- The lack of qualified local technical personnel to take over the installation operation and maintenance. To overcome this obstacle, training sessions were held.

## REPLICABILITY

The success of this project proves that the used technology is a feasible alternative for developing countries. It promotes the survival of villages and is a suitable technology for use in isolated areas that have no natural fresh water, as it exploits non drinking water treatment technologies. The project is also a practical example of the possibilities and potential of using photovoltaic solar energy for water production in isolated settlements without generating negative environmental impacts.

Photo: Canary Islands Institute of Technology (ITC)

## CONTACT


**Agence Nationale pour la Maîtrise de l'Energies (ANME)**
Mr. Abdessalem EL KHAZEN
e-mail: elkhazen@anme.nat.tn
URL: www.anme.nat.tn

**Commission Régionale du Développement Agricole (CRDA) de Kébili**
Mr. Mongi ELguedri
e-mail: mongi_gadri@yahoo.com

**Instituto Tecnológico de Canarias (ITC)**
Mr. Baltasar Peñate
e-mail: agua@itccanarias.org
URL: www.itccanarias.orgg

# Installation of hydraulic ram pumps to supply upland villages with water

**Location:**
The Philippines

**Project's Aim:**
Improve access to water for upland villages

**Technical Answer:**
Installation of hydraulic ram pumps

**Project's Duration:**
January 1996 – December 2007

Photo: AIDFI

In many upland villages in the Philippines the only access to water for inhabitants is the local river, spring and stream. As the river is generally located 200m below the villages, the access to water is extremely difficult, especially bearing in mind that the water has to be carried up hills. This situation leads to shortages in water supply and does not allow for basic sanitation or even for the irrigation of vegetables.

In order to solve this problem and to supply upland villages with an adequate water supply, AIDFI, the Alternative Indigenous Development Foundation, Inc., has modified the hydraulic ram pump technique and promotes its use for this particular landscape. The advantage of the hydraulic ram pump is that no additional energy source, other than the flowing water, is required.

Photo: AIDFI

## BENEFITS

The installation of the hydraulic ram pump system significantly improves access to water. Before the implementation of the system, water was only fetched for drinking and cooking purposes, but now ample water is readily available for other purposes such as sanitation and hygiene, resulting in a significant improvement in the living conditions of the villagers. The system typically provides households with between 200 and 1,000 litres per day, leaving enough water for the irrigation of vegetables and, therefore, the system also improves food security and balanced nutrition.

Furthermore, the immediate access to water avoids using the path to the river, which can be dangerous, and helps to save time. The time saved can be used for productive purposes, e.g. for horticulture and livestock, rice and vegetable farming, which can lead to an increase in income.

## SUSTAINABILITY

The hydraulic ram pump system does not require an external supply of conventional energy, such as fossil fuel or electricity. This is of particular importance since upland villages often lack access to the national

electricity grid and other energy sources, such as diesel, to operate water pumps.

The design of the hydraulic ram pumps has been specifically adapted for use in upland villages. ADIFI trained a number of villagers in maintenance and repair, acknowledging their limited access to tools and spare parts. Therefore, the parts, which need regular replacement, are made out of cheap and locally available materials.

The improved access to water has raised awareness of the importance of protecting and conserving the watershed area to sustain the system. The local community has started to plant fruit and endemic trees in the surrounding area of the hydraulic ram pump system.

## TECHNOLOGY

The hydraulic ram pump uses the power of flowing water to lift a small fraction of the water to a vertical height of over 200m and even, sometimes, up to a 1000m bee line. The water flowing into the ram pump is diverted and the energy produced from the whole flow is directed to only a small fraction of the flow, enabling this fraction to reach up higher than the original source of the water. Depending on the size and intake rates of the ram pump different heights can be reached. The ram pumps can be connected in parallel or in series for large-scale demand.

The water pumped uphill is stored in reservoir tanks, which have capacities ranging from 1,000 to 50,000 litres. Usually the reservoir is filled up during the night and the villagers withdraw the water during the day.

With proper maintenance, the ram pump systems are expected to have a lifetime of at least 20 years.

## FINANCIAL ISSUES

The cost of a hydraulic ram pump system to satisfy the demand of 50 households or 300 people amounts to between €2,200 and €2,700. The largest systems built by AIDFI cost around €20,000: these involved intensive civil works and distribution lines for each household as well as for irrigation.

The investment costs are too high to be borne by the villagers alone. However, external funding via local governments, NGOs or the private sector is possible. Local governments in particular are interested in the ram pump technology, as it is a cheap way to fulfil their obligation to ensure the water supply of remote villages.

Concerning the maintenance and repair costs, the villagers are able to finance these services themselves. All households contribute an easily affordable fee to a village fund on a monthly basis from which the local technicians and the spare parts are financed.

## OBSTACLES

The ram pump system is manufactured and retailed directly by AIDFI, which ensures the quality of the product and avoids problems arising from sub-contractors. Furthermore, AIDFI trains the local people to operate and maintain the hydraulic ram pump systems and supports the implementation phase for four weeks. After this time AIDFI offers further consultancy if problems arise. This procedure makes obstacle-free project implementation possible.

## REPLICABILITY

Over the past 11 years AIDFI has installed 110 ram pumps in 74 communities in the Philippines. Neighbouring villages, which have been convinced by the project, are trying to access funds to install systems in their own communities. In addition, development agencies and NGOs from other countries such as Cambodia, Ecuador, Afghanistan, Nepal, Mongolia and others have expressed interest in the ram pump technology.

The low investment costs and the simple technology, combined with the possibility of local maintenance, makes the ram pump technology highly applicable and replicable in remote upland villages in many parts of the world.

Photo: AIDFI

## CONTACT

**AIDFI (Alternative Indigenous Development Foundation, Inc.)**
Mr. Aladino Moraca
e-mail: aidfi@hotmail.com
URL: www.aidfi.org

# Solar-powered water supply and irrigation system

**Location:**
Chanyauru, Tanzania

**Project's Aim:**
Increase the availability of water for domestic and irrigation purposes at Lake Victoria

**Technical Answer:**
Installation of a hybrid water and irrigation system with solar-driven pump

**Project's Duration:**
June 2005 – December 2006

Photo: GEF Small Grants Programme

Photo: GEF
Small Grants Programme

Many communities along the shores of Lake Victoria suffer from food shortages. The rain-fed agriculture that is practised in this region does not produce sufficient crops to address food and income poverty. Rainfall is scarce and patterns show it to be in decline, which is a limiting factor. Even though the adjacent Lake Victoria offers enough irrigation water to compensate for the insufficient rainfall, this option is rarely used because of limited financial resources and lack of adequate techniques to access the lake water.

Hybrid drinking and irrigation water systems, which are designed to meet the water demand at household and village level, are seen as a solution to the problem. These dual-purpose systems consist of a pump (preferably solar driven), a reservoir tank, distribution canals for irrigation and standpipes for domestic use.

The community-based project was supported financially by the GEF Small Grants Programme, which aims to support demonstrative projects with a special focus on renewable energy. Furthermore, the local government and community provided technical assistance and labour in addition to funding.

## Benefits

Improved access to water has been of benefit to the villagers in many ways. On one hand, the available irrigation water has improved food security as well as increasing income generation through the sale of high value crops. Furthermore, irrigated farming has offered unemployed youths the opportunity to develop entrepreneurial skills e.g. by earning income through horticulture.

On the other hand, immediate access to water for domestic purposes has lessened the women's burden, as it is the women who are responsible for fetching water. In addition, waterborne diseases have

decreased because low quality water is no longer fetched from local ponds.

Nevertheless, consumption of the lake water is not harmless and, therefore, it was necessary to make villagers aware of the need to boil water before use. Furthermore, the villagers were trained to refrain from malpractices that would lower the water quality. Awareness-raising and training in the use of organic fertilisers, as well as proper tillage methods to avoid soil erosion and siltation, have preserved the balanced ecosystem of the lake and, in return, ensured that the water is of a suitable quality for drinking purposes.

## SUSTAINABILITY

The water users have to pay an affordable monthly fee for the right to draw water from the system. This fee contributes to the 'Water Fund', from which maintenance costs and payment for water operators and a watchman are covered. The project group manages the 'Water Fund' through a bank account and the withdrawals of funds follow an elaborate procedure to avoid misuse.

Even though the solar system is easy to run, villagers were trained in the operation and maintenance of the system. These local technicians in turn trained other villagers, thereby increasing the local pool of knowledge.

The availability of funds and the local knowledge to operate and maintain the hybrid water and irrigation system assures the sustainability of the project. Furthermore, the benefits derived from the project, especially in terms of income generation and food security, serve as an incentive to sustain the project.

## TECHNOLOGY

The project focused on the construction of a hybrid water and irrigation system driven by renewable energy. The PV panels that are installed for the solar driven pump provide the energy to fill a water tank; the water is then distributed for further uses. The water used for irrigation is diverted into the main and lateral canals that supply the fields directly. The water for domestic purposes can be withdrawn from central standpipes. In order to implement this project the infrastructure mentioned above, as well as the solar driven pump, had to be constructed.

## FINANCIAL ISSUES

The investment costs - funded by the three partners - amounted to US$50,000. 60% of the costs were covered by the GEF grant, 15% by the local government and 25% by the villagers themselves. The project has been of benefit to 1,000 people, resulting in a cost-benefit ratio that is highly resource efficient with regards to individual and environmental benefits.

After the investment phase, the villagers can easily cover the operation and maintenance costs through the 'Water Fund', which ensures financial sustainability and avoids dependency on external funding in the future.

## OBSTACLES

Guided by an action plan, and supported by skilled labour from the local government, the villagers were responsible for the implementation of the project. A delay in receiving the PV panels, the pump and other necessary building materials reduced the pace of implementation.

Photo: GEF Small Grants Programme

However, the strong partnership between villagers and all participating members overcame this obstacle. The support of the local government sped up the delivery of the missing materials and met the transport costs.

## REPLICABILITY

The project has already been replicated with success in other adjacent communities facing similar problems. All communities along the shores of Lake Victoria demonstrate a considerable need for drinking and irrigation water as these areas are very dry and insufficient rainfall does not allow for the expansion of agriculture.

## CONTACT

**GEF Small Grants Programme**
Mr. Nehemiah Murusuri
e-mail: Nehemiah.murusuri@undp.org
URL: http://sgp.undp.org

SGP The GEF Small Grants Programme

# WISIONS – New directions for the future

Until now, WISIONS has focused on the promotion of good practice projects in the field of resource efficiency and sustainable energy through PREP. Following the successful publication of a dozen very interesting, colourful and comprehensive issues filled with good practice projects, we would now like to move forward and focus on sustainable energy technology issues through the **WISIONS technology radar.**

The experience gained by WISIONS, through its engagement in various project types, regions and technologies, has highlighted key aspects where further promotion is desirable and essential.

## CURRENT SITUATION

The current debate on the future perspectives of the energy system, energy security, climate change as well as reduction of energy poverty means that interest in sustainable energy technologies is increasing and will persist in the future.

On one hand, some future technologies are not yet established, or are still at the R&D stage. On the other hand, those technologies that are fully developed face a number of barriers to their dissemination.

Actually various studies on the potential of renewable energy technologies do exist, describing successfully implemented options, trends, barriers and key drivers. On the other hand comprehensive overviews of promising technologies and their future potential are few and far between.

There is, therefore, an acute need for additional detailed and quality information to be available to the public, the media and in the financial sector. Short, transparent and customised pieces of information, as well as examples of successfully implemented technologies, are essential but often lacking. This holds true for the technology portfolio in both industrialised and developing countries.

However, when considering developing countries, such information needs to take the differences into account. Sophisticated technologies with high standards of delivery, as used in the developed world, do not necessarily satisfy the needs of countries with low-electrification and off-grid regions. In addition, the demand for energy services is often quite different in developing countries.

Photo: photocase.de@ joergkrumm/akai

Photo: Dietmar Schüwer

## RADAR FOR SUSTAINABLE ENERGY TECHNOLOGIES

In response to these issues, WISIONS is taking a new direction. In future, in addition to continuing with SEPS, WISIONS will complement the existing overviews of successful good practice by developing the **WISIONS technology radar**. The purpose will be to analyse and present current and future technology solutions in a way that will meet the needs described above. The radar will not only highlight technical issues, but will also illustrate social and economic aspects that are essential for the sustainable and successful implementation of energy technologies.

Beginning with a look at basic needs such as heat, cooking, water supply and lighting, key questions on existing and future technologies will be raised, for example:

- Which needs are addressed and how adaptable is the technology to local circumstances?
- What will be the future development?
- How efficient is the technology and what is its improvement potential?
- What are the lessons learned, key drivers and barriers so far?
- What makes investment into the technology worthwhile and for whom?
- What type of set-up is needed to make the technology economically viable?

Within the technology radar, WISIONS will analyse key technologies and aims to respond to those questions identified above.

In addition to launching the **technology radar** on the WISIONS webpage (in summer 2008), brochures detailing the above findings, combined with the presentation of existing good practice projects, will be released.

For news on WISIONS, the **technology radar** and SEPS, please consult our webp age, which is updated on a regular basis, www.wisions.net.

# SEPS — Sustainable Energy Project Support

To complement the promotion of good practice projects, WISIONS aims to bridge the gap between the existence of good concepts and their lack of implementation through the SEPS initiative.

The key objective of SEPS is to identify projects with the real potential to be of strategic importance in the renewable and efficient use of energy. By providing technical and other forms of support, SEPS seeks to overcome existing barriers, helping clean and efficient energy to become commonplace.

The most promising renewable and energy efficiency concepts are selected using transparent analysis based on internationally recognised criteria. The selection process is carried out via an annual call for applications (usually during the summer). Once a project is selected, SEPS can provide additional guidance and support, for example:

- potential financial support to assist with project implementation
- practical expert advice and knowledge transfer for effective implementation
- promotion to relevant institutions, decision makers and scientists
- publication on www.wisions.net

Projects supported must be innovative, sustainable and possible to replicate in other parts of the world. They have to be at an implementation ready stage and a well-developed implementation strategy must exist.

## Examples of Projects Supported by SEPS

**Carbon Credits providing Finance for Andean Solar Villages**

For several years Fundacion EcoAndina has been successfully promoting solar technology for cooking and heating in the Argentinean province of Jujuy. Despite the fact that the solar cookers are technically proven and socially well accepted by the local population, the Andean Solar Villages still lack sustainable financing. Therefore, the main objective of this SEPS supported project, which started in spring 2007, is to develop a strategy for the optimal use of carbon credits to make solar equipment affordable for the users. 50 solar cookers are being monitored in a field test to assess their $CO_2$ reductions. In collaboration with partners in Germany, a strategy is being developed whereby local users can finance their solar cookers through the carbon credit market.

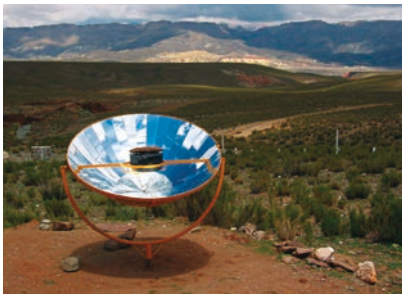

Photo: Fundación EcoAndina

**Biogas Demonstration Units for Small Animal Farms**

In rural areas of Jordan, where people rely on raising animals for their source of income, the National Energy Research Center is planning to introduce small-scale biogas technology. The project's aim is to develop and promote the construction of small animal farm biogas digesters with a size of $10m^3$, fuelled by cattle manure. In the second stage of the project, training courses and site visits will be held for local farmers and the technology will also be promoted to interested stakeholders and the financial sector. The project was selected in the fourth SEPS round and is to be implemented by 2009.

## Criteria for Obtaining SEPS Support

SEPS has a set of criteria used in selecting appropriate sustainable projects and relevant forms of support. The following 5 criteria are obligatory:

- technical viability of the project
- economic feasibility
- local and global environmental benefits
- marketability and replication possibilities
- implementation strategy

As the goal of sustainable development requires an integrated approach, additional criteria are also applicable, such as:

- social aspects
- inclusion of local population/structures
- employment potential
- cooperation with other stakeholders

## So far ...

In the four calls that have taken place to date, thirty-seven projects have been selected for SEPS financial support, covering a broad array of innovative sustainable energy solutions in more than 21 countries.

The project proposals have demonstrated a wide range of ideas: from the use of solar energy for food conservation to the application of small hydropower for supplying energy to villages and improvements in energy efficiency on a university campus in Mauritius. In order to contribute to the implementation of more intelligent energy projects, WISIONS makes an annual call each summer for SEPS applications.

Further information about SEPS can be found on www.wisions.net/pages/SEPS.htm

# Contact us:

More information about WISIONS, application criteria for SEPS, as well as prior PREP-issues are available at

www.wisions.net

Wuppertal Institute
for Climate, Environment and Energy
Doeppersberg 19
42103 Wuppertal
Germany

e-mail: info@wisions.net
Phone: + 49 (0) 202 . 24 92 252

**Wuppertal Institute**
**for Climate, Environment and Energy**



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